2015 Rabies Summary
Massachusetts Department of Public Health

The following summarizes data collected on animal specimens from Massachusetts sent to the Massachusetts State Public Health Laboratory (MASPHL) for rabies testing from January to December 2015. A cumulative report summarizing rabies testing from 1992-2002, and annual reports from 2003 to 2014 are available on the MDPH website at www.mass.gov/dph/rabies.

Number of Submissions and Positive Results by Year

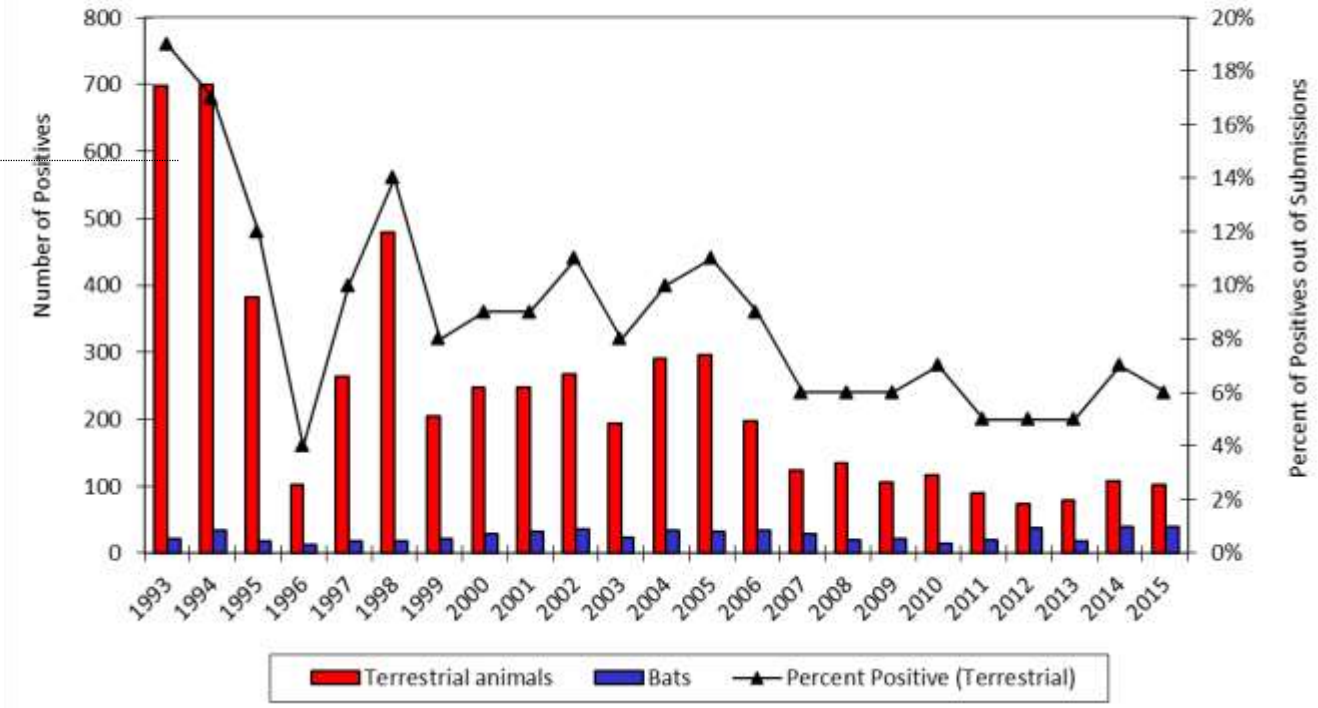
The number and percentage of bats and terrestrial animals that tested positive in 2015 was nearly the same as in the previous year (see **Table 1 and Figure 1**).

Table 1. Number of Submissions, Positive Results and Percent* Positive by Year and Type of Animal

	TERRESTRIAL ANIMALS			BATS		
Year	Number Submitted	Number Positive	% Positive	Number Submitted	Number Positive	% Positive
1992	926	42	5%	143	15	10%
1993	3660	698	19%	289	22	8%
1994	4119	700	17%	391	34	9%
1995	3175	383	12%	241	17	7%
1996	2701	103	4%	277	12	4%
1997	2771	264	10%	334	17	5%
1998	3483	480	14%	439	18	4%
1999	2643	205	8%	595	21	4%
2000	2666	247	9%	611	29	5%
2001	2615	248	9%	710	32	4%
2002	2505	267	11%	613	36	6%
2003	2358	193	8%	602	23	4%
2004	2842	291	10%	600	34	6%
2005	2653	296	11%	708	33	5%
2006	2122	197	9%	756	34	5%
2007	1988	123	6%	787	29	4%
2008	2298	135	6%	748	19	3%
2009	1747	106	6%	696	21	3%
2010	1740	117	7%	678	14	2%
2011	1700	90	5%	753	20	3%
2012	1594	73	5%	1196	38	3%
2013	1644	79	5%	1045	18	2%
2014	1644	108	7%	1175	40	3%
2015	**1642**	**103**	**6%**	**1073**	**39**	**4%**
Total	**57,236**	**5,548**	**10%**	**15,460**	**615**	**4%**

* Calculated to nearest percent

Figure 1: Numbers of Animals Positive for Rabies and Percent Positive by Year: Massachusetts, 1992-2015



Notable Rabies Situations

In 2015, 2,715 specimens were submitted to the MASPHL for rabies testing. Of these specimens, 142 (5%) tested positive for rabies. **Table 2** shows data on positive animals for 2015. In 2015, two domestic animals tested positive; both were cats.

In Hampden County, a one year old, unvaccinated cat developed neurologic symptoms approximately eight weeks after being placed under six month quarantine for wounds of unknown origin. The cat was euthanized and tested positive for rabies. Five individuals at an animal shelter/veterinary facility were bitten or scratched by the cat prior to it being euthanized and all received post-exposure rabies prophylaxis; none had previously received the rabies vaccine series. The cat was one of nine indoor/outdoor cats owned by the same individual. The owner sustained a scratch from the positive cat in the days prior to it being euthanized and received post-exposure rabies prophylaxis. The local Animal Inspector placed the remainder of the cats in the home under quarantine.

In Berkshire County, a stray cat was found in the road by a resident, who presumed it had been hit by a car because it was dragging its hind legs. While waiting for the local animal control officer to arrive, the cat became aggressive and bit the resident. The animal was euthanized and tested positive for rabies. The resident who was bitten by the cat received post-exposure rabies prophylaxis.

A small cluster of rabid animals (raccoons and skunks) was identified on the mainland side of the Cape Cod Canal (see Figure 5). Because oral rabies vaccine baits are now being distributed along the south-east edge of the Cape Cod Canal during the fall and spring, positive animals on the north-west edge are an indication of potential transmission pressure being applied to the geographic barrier of the canal. Several clusters of positive animals were found along the north-west canal edge in the months preceding the first identification of raccoon rabies on Cape Cod in March, 2004.

Number of Submissions and Positive Results by Species

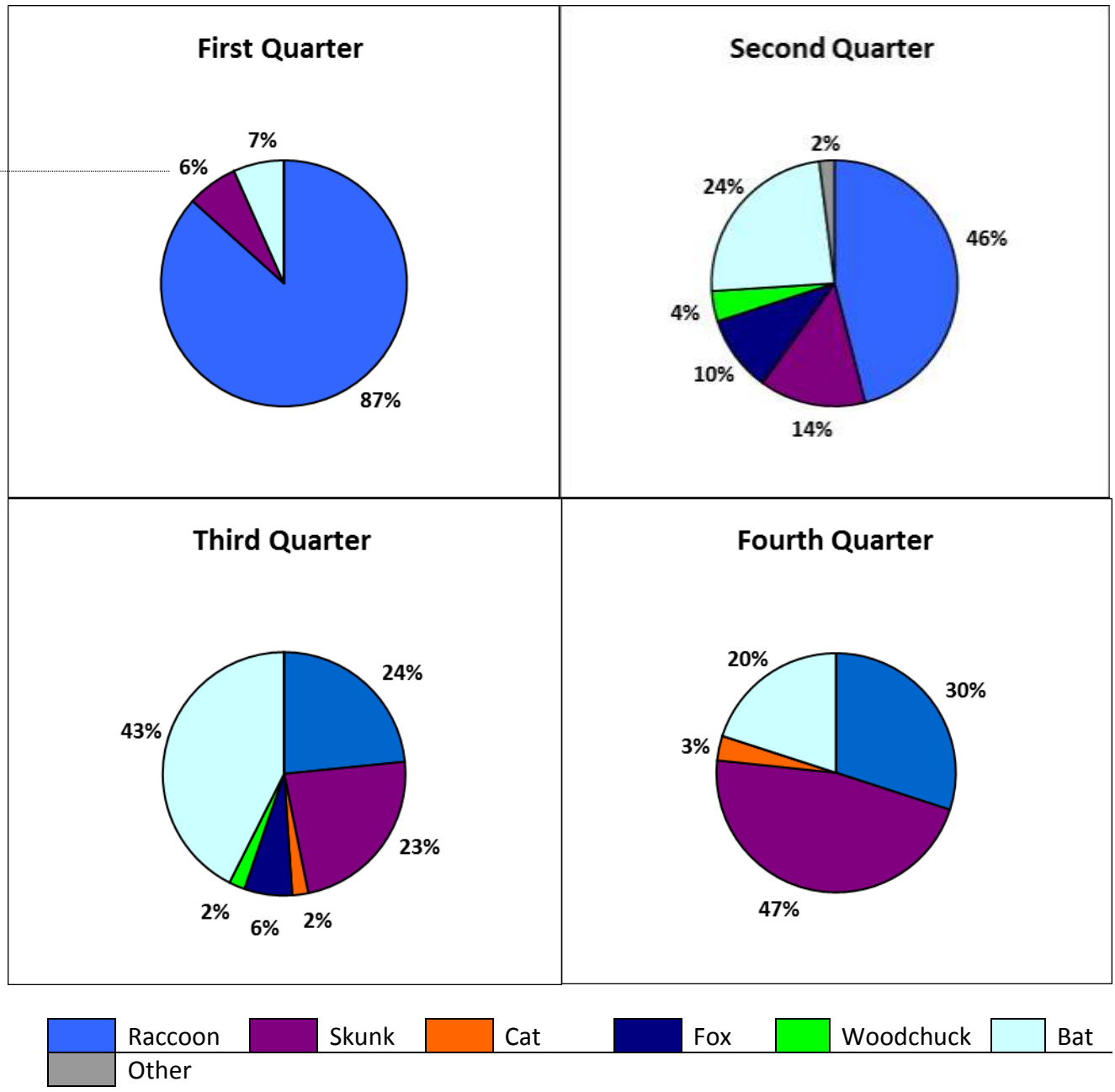
Raccoons, skunks and bats together, accounted for the large majority of rabies positive animals in Massachusetts, although their proportion of all rabies positive animals varied by quarter (**Figure 2**).

Table 2. Number of Animals Positive for Rabies/Animals Submitted (%), 2015

	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			Total		
Animal	Number Positive	Number Submitted	%	Number Positive	Number Submitted	%	Number Positive	Number Submitted	%	Number Positive	Number Submitted	%	Number Positive	Number Submitted	%
Raccoon	13	18	72.2%	23	60	38.3%	11	28	39.3%	9	16	56.3%	56	122	45.9%
Skunk	1	7	14.3%	7	10	70.0%	11	57	19.3%	14	23	60.9%	33	97	34.0%
Cat	0	125	0%	0	164	0%	1	268	0.4%	1	158	0.6%	2	715	0.3%
Fox	0	4	0%	5	7	71.4%	3	13	23.1%	0	6	0%	8	30	26.6%
Woodchuck	0	0	0%	2	42	4.8%	1	37	2.7%	0	0	0%	3	79	3.8%
Bat	1	103	1.0%	12	279	4.3%	20	643	3.1%	6	48	12.5%	39	1073	3.6%
Cow	0	1	0%	0	1	0%	0	0	0%	0	0	0%	0	2	0%
Coyote	0	2	0%	1	1	100%	0	0	0%	0	0	0%	1	3	33.3%
Dog	0	112	0%	0	129	0%	0	145	0%	0	111	0%	0	497	0%
Other*	0	11	0%	0	28	0%	0	29	0%	0	28	0%	0	96	0%
Total	15	383	3.9%	50	721	6.9%	47	1221	3.8%	30	390	7.7%	142	2715	5.2%

* Includes squirrels, rabbits, sheep, pig, goats, horses, chipmunks, bobcat, mink, muskrats, rats, alpacas, deer, mice, otter, seals, weasel, guinea pig, and opossums

Figure 2. Proportion of All Positive Results Represented by Each Species, by Quarter, 2015



*Other: Coyote

Cumulative Submissions and Results by Month

Animal submission numbers fluctuated throughout the year. As might be expected, the highest number of submissions for both terrestrial animals and bats occurred during June, July and August (see **Table 3**). This same trend is seen annually and is due to the greater activity of wildlife species during the spring and summer months, coinciding with the time that humans increase outdoor activity. These simultaneous events result in more frequent contact between humans and wildlife, and lead to more animal rabies testing.

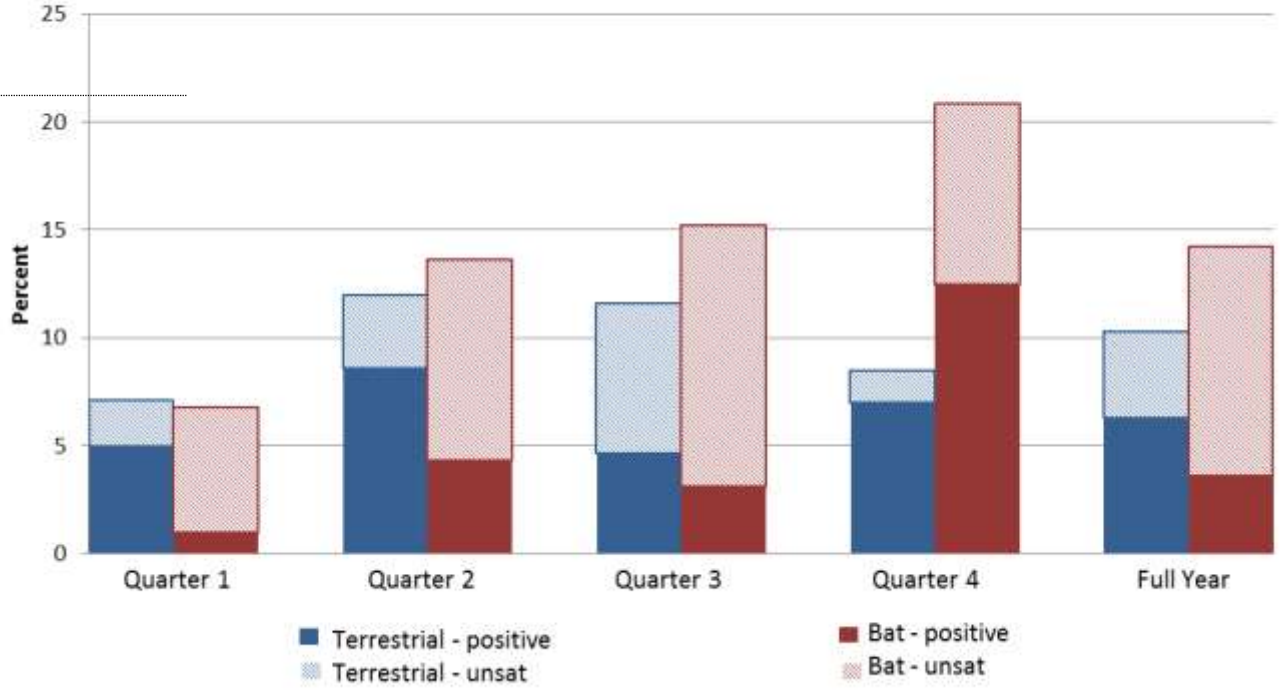
The proportion of animals testing positive and unsatisfactory for rabies also varies throughout the year, generally showing a consistent pattern from year-to-year (see **Table 3 and Figure 3**). The change in the percent positive is normally small between years during the same month and significant departures from this seasonal pattern can be used to detect alterations in the intensity of virus circulation in an area.

Table 3. Submissions, Number Positive and Unsatisfactory for Rabies, and Percent* Positive and Unsatisfactory by Month and Animal Type: 2014 and 2015

	TERRESTRIAL ANIMALS										BATS									
Month	**Submitted 2014**	**Positive 2014**		**Unsatisfactory 2014**		**Submitted 2015**	**Positive 2015**		**Unsatisfactory 2015**		**Submitted 2014**	**Positive 2014**		**Unsatisfactory 2014**		**Submitted 2015**	**Positive 2015**		**Unsatisfactory 2015**	
January	123	9	7%	0	0%	84	3	4%	1	0%	45	0	0%	3	7%	41	0	0%	0	0%
February	93	7	8%	1	1%	97	4	4%	1	1%	29	0	0%	1	3%	25	0	0%	5	20%
March	130	8	6%	4	3%	99	7	7%	4	3%	39	1	3%	4	10%	37	1	3%	1	3%
April	129	11	9%	4	3%	118	12	10%	2	2%	43	1	2%	7	16%	41	1	2%	3	7%
May	149	11	7%	4	3%	131	14	11%	3	2%	61	4	7%	4	7%	98	6	6%	15	6%
June	153	4	3%	7	5%	193	12	6%	10	5%	163	6	4%	14	9%	140	5	4%	8	4%
July	182	6	3%	7	4%	242	12	5%	13	5%	192	3	2%	15	8%	192	4	2%	24	13%
August	182	13	7%	7	4%	165	6	4%	17	10%	493	14	3%	50	10%	428	11	3%	49	12%
September	137	11	8%	5	4%	171	9	5%	10	6%	44	5	11%	12	27%	23	5	22%	5	22%
October	150	16	11%	2	1%	128	4	3%	2	2%	24	4	17%	3	13%	19	3	16%	1	5%
November	104	4	4%	2	2%	109	16	15%	1	1%	24	2	8%	1	4%	10	0	0%	2	20%
December	112	8	7%	4	4%	105	4	4%	2	2%	18	0	0%	2	11%	19	3	16%	1	5%
TOTAL	**1644**	**108**	**7%**	**47**	**3%**	**1642**	**103**	**6%**	**66**	**4%**	**1175**	**40**	**3%**	**116**	**10%**	**1073**	**39**	**4%**	**114**	**11%**

* Calculated to nearest percent

Figure 3: Percent Positive and Unsatisfactory of All Submissions, by Species, by Quarter: 2015



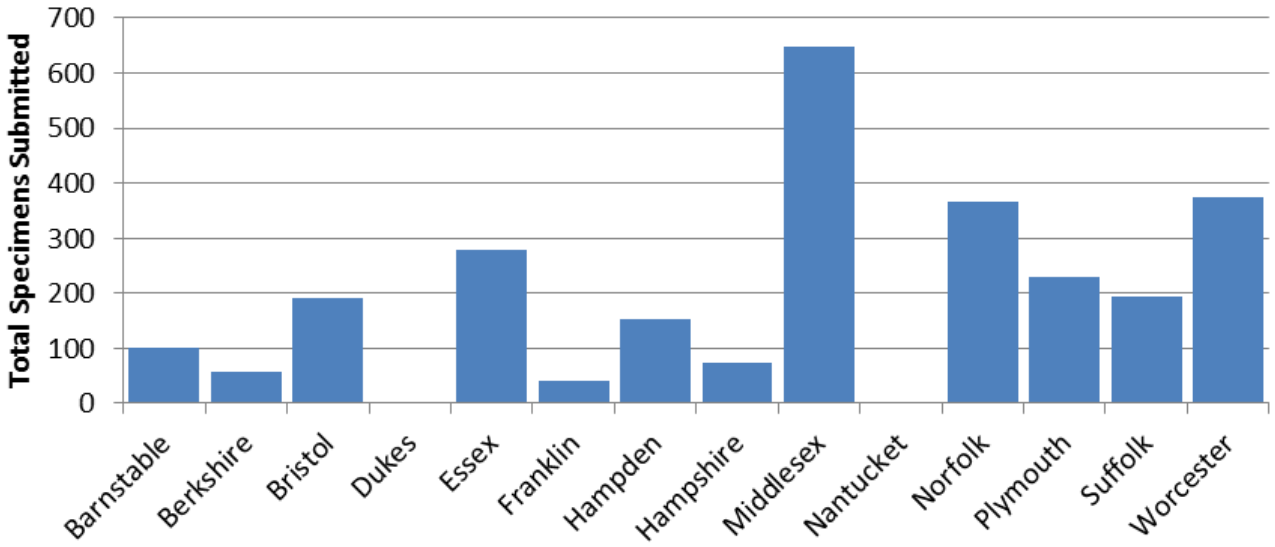
The distribution of results of rabies testing that were positive and of specimens unsatisfactory for testing varies throughout the year and by animal type (terrestrial versus bats) (**Figure 3**). In every quarter, more bats are unsatisfactory for testing than test positive for rabies. In contrast, the number of unsatisfactory terrestrial animals was less than positive ones in all but the third quarter. Over the course of the year, nearly twice as many terrestrial animals were positive than were unsatisfactory while there were three times as many unsatisfactory bats as there were positive ones.

Submissions and Positive Results by County

In 2015, all counties in Massachusetts submitted at least one animal for rabies testing, and all counties, except Dukes and Nantucket, had at least one animal that tested positive (see **Table 4 and Figure 4**). Middlesex, Worcester, and Norfolk counties submitted the highest number of animals (n = 649, n = 375, n = 365, respectively). Middlesex, Worcester and Norfolk County also had the highest number of animals that tested positive (n=28, n=19, n=19) and Berkshire County had the highest percentage of submitted animals that tested positive (15.8%).

Table 4. Rabies Testing Data by County- Number of Animals Positive for Rabies/Number of Animals Submitted (%)										
County	**1st Quarter**		**2nd Quarter**		**3rd Quarter**		**4th Quarter**		**Cumulative**	
Barnstable	0/10	(-- %)	0/30	(-- %)	0/43	(-- %)	1/19	(5.3%)	1/102	(1.0%)
Berkshire	0/8	(-- %)	3/12	(0.3%)	3/25	(0.1%)	3/12	(25.0%)	9/57	(15.8%)
Bristol	0/22	(-- %)	5/61	(8.2%)	3/71	(4.2%)	2/37	(5.4%)	10/191	(5.2%)
Dukes	0/0	(-- %)	0/0	(-- %)	0/2	(-- %)	0/0	(-- %)	0/2	(-- %)
Essex	3/43	(7.0%)	3/62	(4.8%)	4/129	(3.1%)	6/46	(13.0%)	16/280	(5.7%)
Franklin	1/9	(11.1%)	1/10	(10.0%)	2/19	(10.5%)	2/2	(100.0%)	6/40	(15.0%)
Hampden	1/34	(2.9%)	7/48	(14.6%)	4/50	(8.0%)	3/22	(13.6%)	15/154	(9.7%)
Hampshire	0/7	(-- %)	0/18	(-- %)	5/33	(15.2%)	1/16	(6.3%)	6/74	(8.1%)
Middlesex	2/97	(2.1%)	12/161	(7.5%)	10/313	(3.2%)	4/78	(5.1%)	28/649	(4.3%)
Nantucket	0/0	(-- %)	0/1	(-- %)	0/0	(-- %)	0/0	(-- %)	0/1	(-- %)
Norfolk	3/50	(6.0%)	7/101	(6.9%)	7/174	(4.0%)	2/40	(5.0%)	19/365	(5.2%)
Plymouth	2/26	(7.7%)	2/61	(3.3%)	3/112	(2.7%)	0/31	(-- %)	7/230	(3.0%)
Suffolk	1/29	(3.4%)	1/55	(1.8%)	3/84	(3.6%)	1/27	(3.7%)	6/195	(3.1%)
Worcester	2/48	(4.2%)	9/101	(8.9%)	3/166	(1.8%)	5/60	(8.3%)	19/375	(5.1%)

Figure 4: The Number of Animals Submitted for Rabies Testing by County: 2015



Mapping

MDPH maps rabies-positive terrestrial animals on an annual basis (see **Figure 5**).

Figure 5.